

## **REMARKS**

This is a full and timely response to the Office Action of January 14, 2004.

Reexamination, reconsideration, and allowance of the application and all presently pending claims are respectfully requested.

Upon entry of this Second Response, claims 1-30 are pending in this application. Claims 20 and 21 are directly amended herein, and claims 22-30 are newly added. It is believed that the foregoing amendments add no new matter to the present application.

### **Response to §103 Rejections**

“The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.” *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988) (Citations omitted). Furthermore, “(o)ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.” *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

### Claim 1

Claim 1 presently stands rejected under 35 U.S.C. §103 as unpatentable over *Novak* in view of *Gulsen*. Applicant respectfully asserts that the combination of *Novak* and *Gulsen* is improper and the rejection of claim 1 under 35 U.S.C. §103 should, therefore, be withdrawn.

In an apparent attempt to justify the combination of *Novak* and *Gulsen*, the Office Action states

“A person of ordinary skill in the art at the time the invention was made would have recognized that the memory management routine of *Gulsen* reduces the time necessary to restore the current task and preserves the data of the current task for future use by only copying and restoring information that would be written over by the next task in shared resources. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to incorporate the memory management of *Gulsen* in the device of *Novak* to reduce the time necessary to restore the current task and preserve data needed for future use.”

However, there is nothing **in the cited art** to indicate that it would have been obvious to one of ordinary skill in the art, at the time of filing of the instant application, to incorporate the memory management system of *Gulsen* to reduce the time necessary to restore the current task and preserve data needed for future use.

In this regard, *Novak et al.* appears to disclose a microprocessor that manages process switching by storing a unique process identification number (PID) in a “process identification register (PIDR),” and providing this PID with each instruction or data entry in cache. See *Novak et al.*, col. 8, lines 17-20. When a new process is initiated, it appears that the microprocessor in *Novak et al.* “stores the unique process identification number assigned to process 1” and “assigns a unique process identification number to process 2,” which the microprocessor then stores in the PIDR and provides with each instruction or data entry in cache associated with process 2. See *Novak et al.*, col. 8, lines 47-55.

Thus, in response to a context switch, the “microprocessor switches back to process 1,” and “those instructions and data for process 1 that have not been replaced by instructions and data for process 2 remain in the cache and can be accessed, because the microprocessor will reload the unique process identification number for process 1 and that number will still be in the PID locations associated with process 1 instructions and data that have not been replaced by a subsequent process.” See *Novak et al.*, col. 8, lines 57-65.

Pivotaly, *Novak* does not appear to teach or suggest “restor[ing] the current task and preserv[ing] data needed for future use,” as cited in the Office Action as the motivation for combining the references. *Novak* teaches tagging the cache lines in the cache so that a current process could use those tagged cache lines corresponding to the current processes PID number. Thus, the Office Action’s alleged motivation for combining *Novak* and *Gulsen* is insufficient for overcoming its burden of establishing a prima facie case of obviousness.

For at least the reasons set forth above, Applicant respectfully submits that the 35 U.S.C. §103 rejection of claim 1 is improper.

#### **Claims 2-6, 28, 29**

Claims 2 through 6 presently stand rejected under 35 U.S.C. §103 as unpatentable over *Novak*. in view of *Gulsen* and claims 28 and 29 are newly added. Applicant submits that the pending dependent claims 2-6, 28, and 29 contain all features of their respective independent claim 1. Since claim 1 should be allowed, as argued hereinabove, pending dependent claims 2-6, 28, and 29 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Furthermore, these dependent claims recite patentably distinct features and/or combinations of features that make them allowable, notwithstanding the allowability of their base claim 1.

### **Claim 7**

Claim 7 presently stands rejected under 35 U.S.C. §103 as unpatentable over *Novak* in view of *Gulsen*. For at least the reason set forth hereinabove with reference to claim 1, Applicant respectfully asserts that the alleged combination of *Novak* and *Gulsen* is improper, and the 35 U.S.C. §103 rejection of claim 7 should be withdrawn.

### **Claims 8-11**

Claims 8 through 11 presently stand rejected under 35 U.S.C. §103 as unpatentable over *Novak* in view of *Gulsen*. Applicant submits that the pending dependent claims 8 through 11 contain all features of their respective independent claim 7. Since claim 7 should be allowed, as argued hereinabove, pending dependent claims 8 through 11 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Furthermore, these dependent claims recite patentably distinct features and/or combinations of features that make them allowable, notwithstanding the allowability of their base claim 7.

### **Claim 12**

Claim 12 presently stands rejected under 35 U.S.C. §103 as unpatentable over *Novak* in view of *Gulsen*. For at least the reason set forth hereinabove with reference to claim 1, Applicant respectfully asserts that the alleged combination of *Novak* and *Gulsen* is improper, and the 35 U.S.C. §103 rejection of claim 12 should be withdrawn.

### **Claims 13-15**

Claims 13 through 15 presently stand rejected under 35 U.S.C. §103 as unpatentable over *Novak* in view of *Gulsen*. Applicant submits that the pending dependent claims 13 through 15 contain all features of their respective independent claim 12. Since claim 12 should be allowed, as argued hereinabove, pending dependent claims 13 through 15 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Furthermore, these dependent claims recite patentably distinct features and/or combinations of features that make them allowable, notwithstanding the allowability of their base claim 12.

### **Claim 16**

Claim 16 presently stands rejected under 35 U.S.C. §103 as unpatentable over *Novak* in view of *Gulsen*. For at least the reason set forth hereinabove with reference to claim 1, Applicant respectfully asserts that the alleged combination of *Novak* and *Gulsen* is improper, and the 35 U.S.C. §103 rejection of claim 16 should be withdrawn.

### **Claims 17-19**

Claims 17 through 19 presently stand rejected under 35 U.S.C. §103 as unpatentable over *Novak* in view of *Gulsen*. Applicant submits that the pending dependent claims 17

through 19 contain all features of their respective independent claim 16. Since claim 16 should be allowed, as argued hereinabove, pending dependent claims 17 through 19 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Furthermore, these dependent claims recite patentably distinct features and/or combinations of features that make them allowable, notwithstanding the allowability of their base claim 16.

### **Response to §102 Rejections**

A proper rejection of a claim under 35 U.S.C. §102 requires that a single prior art reference disclose each element of the claim. See, e.g., *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983).

### **Claim 20**

Claim 20 presently stands rejected under 35 U.S.C. §102 as allegedly anticipated by *Gulsen*. Amended claim 20 reads as follows:

20. A computer system for efficiently executing instructions of computer programs, comprising:  
a processing unit;  
computer memory residing outside of the processing unit;  
cache memory; and  
***logic configured to store in said computer memory a value indicative of cache memory usage and a mapping associated with said value, said mapping indicative of a location in said computer memory storing data previously requested or previously written by an instruction of a first process being executed by the processing unit when the processing unit context switches out the first process for processing of a second process, the logic further configured to retrieve said data, based on said value, and store said data in said cache, said processing unit continuing execution of said first process with the retrieved data when the processing unit context switches out the second process and context switches in the first process.*** (Emphasis added).

Applicant respectfully asserts that *Gulsen* fails to disclose at least the features of amended claim 20 highlighted hereinabove.

It is alleged in the Office Action that *Gulsen* teaches

“memory control circuitry coupled to said processing circuitry, said memory control circuitry, in response to said second context switch command, configured to identify one of said addresses of said computer memory that is storing a data value previously written by said pipeline during execution of an instruction of said one computer program prior to said first context switch, said memory control circuitry further configured to retrieve said data value from said computer memory in response to said second context switch command and to store said retrieved data value in said cache memory.”

See Office Action at page 5.

However, there is nothing in *Gulsen* to indicate that the alleged “memory control circuitry” retrieves data based on a “value indicative of cache memory usage,” as described by claim 20. Accordingly, Applicant respectfully asserts that *Gulsen* fails to disclose each feature of claim 20 and requests that the 35 U.S.C. §102 rejection of claim 20 be withdrawn.

#### **Claims 22-24**

Claims 22-24 are newly added dependent claims that depend from claim 20.

Applicant submits that the pending dependent claims 22-24 contain all features of their respective independent claim 20. Since claim 20 should be allowed, as argued hereinabove, pending dependent claims 22-24 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Furthermore, these dependent claims recite patentably distinct features and/or combinations of features that make them allowable, notwithstanding the allowability of their base claim 20.

## Claim 21

Claim 21 presently stands rejected under 35 U.S.C., §102 as allegedly anticipated by *Gulsen*. Amended claim 21 reads as follows:

21. A method for efficiently executing instructions of computer programs, comprising the steps of:

***storing in memory outside of a processing unit a value indicative of cache memory usage;***

storing in said memory a mapping corresponding to said value indicative of cache memory usage, said mapping indicative of a location in computer memory storing data previously requested or previously written by an instruction of a first process being executed by the processing unit when the processing unit context switches out the first process for processing of a second process;

***retrieving said data, based upon said value, when the processing unit context switches out the second process and context switches in the first process;*** and

continuing execution of said first process with the data retrieved in the retrieving step. (Emphasis added).

Applicant respectfully asserts that *Gulsen* fails to disclose at least the features of amended claim 21 highlighted hereinabove.

It is alleged in the Office Action that *Gulsen* teaches

“memory control circuitry coupled to said processing circuitry, said memory control circuitry, in response to said second context switch command, configured to identify one of said addresses of said computer memory that is storing a data value previously written by said pipeline during execution of an instruction of said one computer program prior to said first context switch, said memory control circuitry further configured to retrieve said data value from said computer memory in response to said second context switch command and to store said retrieved data value in said cache memory.”

See Office Action at page 5.

However, there is nothing in *Gulsen* to indicate that the alleged “memory control circuitry” retrieves data based on a “value indicative of cache memory usage,” as described by claim 21. Accordingly, Applicant respectfully asserts that *Gulsen* fails to disclose each feature of claim 21 and requests that the 35 U.S.C. §102 rejection of claim 21 be withdrawn.



### **Claims 25-27**

Claims 25-27 are newly added dependent claims that depend from claim 21.

Applicant submits that the pending dependent claims 25-27 contain all features of their respective independent claim 21. Since claim 21 should be allowed, as argued hereinabove, pending dependent claims 25-27 should be allowed as a matter of law for at least this reason. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Furthermore, these dependent claims recite patentably distinct features and/or combinations of features that make them allowable, notwithstanding the allowability of their base claim 21.

### **Claim 30**

Claim 30 is newly added and reads as follows:

30. A system, comprising:  
a processing unit;  
cache memory comprising a cache line, the cache line comprising data used by a first process during execution by said processing unit; and  
logic configured to track an usage frequency of said cache line, said logic further configured to store in computer memory a value indicative of the usage frequency and a mapping associated with said data used from said cache line by said first process upon a first context switch, said logic further configured to preload said data into said cache upon a second context switch based on said value.

Applicant respectfully submits that the cited art fails to disclose each limitation of claim 30.

Therefore, claim 30 is allowable.

**CONCLUSION**

Applicant respectfully requests that all outstanding objections and rejections be withdrawn and that this application and all presently pending claims be allowed to issue. If the Examiner has any questions or comments regarding Applicant's response, the Examiner is encouraged to telephone Applicant's undersigned counsel.

Respectfully submitted,

**THOMAS, KAYDEN, HORSTEMEYER &  
RISLEY, L.L.P.**

By: 

Ann I. Dennen  
Reg. No. 44,651  
(256) 704-3900

Hewlett-Packard Development Company, L.P.  
Intellectual Property Administration  
P.O. Box 272400  
Fort Collins, Colorado 80527-2400